	Application No.	Applicant(s)
Notice of Allowability	09/664,499	VEKIARIDES, NICOS A.
	Examiner	Art Unit
	Hussein A. El-chanti	2157

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *1/16/2007.*

2. ☒ The allowed claim(s) is/are *1-24 and 26-49.*

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All   b) ☐ Some*   c) ☐ None of the:

        1. ☐ Certified copies of the priority documents have been received.

        2. ☐ Certified copies of the priority documents have been received in Application No. _____ .

        3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

    * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.

    (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached

        1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____ .

    (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of

    Paper No./Mail Date _____

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)

2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)

3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____

4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material

5. ☐ Notice of Informal Patent Application

6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .

7. ☒ Examiner's Amendment/Comment

8. ☒ Examiner's Statement of Reasons for Allowance

9. ☐ Other _____ .

ABID ETIENNE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100

EXAMINER'S AMENDMENT

1.   This action is responsive to communication received on Jan. 16, 2007.

2.   An examiner's amendment to the record appears below. Should the changes

and/or additions be unacceptable to applicant, an amendment may be filed as provided

by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be

submitted no later than the payment of the issue fee.

3.   Authorization for this examiner's amendment was given in a telephone interview

with Mr. Thomas Auchterlonie on March 28, 2007.

4.   The application has been amended as follows:

1.   **(Currently amended)**   A method of mirroring data in a computer network,

comprising the steps of:

establishing at least one connection between a local storage server and a mirror

storage server;

receiving a primary storage request from a network host at the local storage

server;

sending a mirror storage request across the established at least one connection

from the local storage server to the mirror storage server, wherein the mirror storage

request corresponds to the received primary storage request;

processing the mirror storage request at the mirror storage server;

sending a first heartbeat signal at regular first intervals from the local storage

server to the mirror storage server;

sending a second heartbeat signal at regular second intervals from the mirror

storage server to the local storage server;-and

monitoring reception of the first heartbeat signal and the second heartbeat signal

for interruption in the regular receipt thereof,-respectively. respectively:

detecting an interruption in the second heartbeat signal at the local storage

server; and

closing the established at least one connection.

2.   **(Currently amended)** The method of claim 1, further comprising the steps-step

of:

detecting an interruption in the second heartbeat signal at the local storage

server;

closing the established at least one connection; and

queuing mirror storage requests that result from primary storage requests that

are received during the detected interruption.

7.   **(Currently amended)** The method of claim 1, wherein said processing step

comprises the steps of comprises:

storing data of the received mirror storage request in a mirror storage device

corresponding to a primary storage device.

19.   **(Currently amended)** The method of claim 1, wherein the local storage server is

operating in an asynchronous mirror mode, further comprises the steps of comprises:

processing the primary storage request; and

sending the results of the processed primary storage request to the network host.

20.   (Currently amended) The method of claim 1, wherein the local storage server is operating in a synchronous mirror mode, further ~~comprises the steps of~~ comprises:

processing the primary storage request;

waiting for a response corresponding to the sent mirror storage request from the mirror storage server; and

sending the results of the processed primary storage request to the network host after the response is received from the mirror storage server.

21.   (Currently amended) The method of claim 1, further ~~comprises the steps of~~ comprises:

determining whether a LUN related to the received primary storage request is designated to be mirrored.

24.   (Currently amended) A method of bi-directional mirroring of data in computer networks, comprising the steps of:

establishing a first connection between a local storage server and a remote storage server;

establishing a second connection between the local storage server and the remote storage server;

receiving a first local storage request from a first network host at the local storage server;

sending a first local mirror storage request from the local storage server across the first connection, wherein the first local mirror storage request corresponds to the first received local storage request;

receiving the first local mirror storage request at the remote storage server;

storing data received in the first local mirror storage request in at least one remote storage device coupled to the remote storage server;

receiving a first remote storage request from a second network host at the remote storage server;

sending a first remote mirror storage request from the remote storage server across the second connection, wherein the first remote mirror storage request corresponds to the received first remote storage request;

receiving the first remote mirror storage request at the local storage server;

storing data received in the first remote mirror storage request in at least one local storage device coupled to the local storage server;

sending a first heartbeat signal from the local storage server to the mirror storage server;

sending a second heartbeat signal from the remote storage server to the local storage server;~~and~~

monitoring reception of the first heartbeat signal and the second heartbeat signal for interruption in the regular receipt thereof, ~~respectively.~~respectively:

detecting an interruption in the second heartbeat signal at the local storage server; and

closing the first connection.

26.   (Currently amended) The method of claim 24, further comprising the ~~steps~~step of:

~~detecting an interruption in the second heartbeat signal at the local storage~~

~~server;~~

~~closing the established first connection;~~

receiving at least a second local storage request at the local storage server; and

queuing at least a second local mirror storage request at the local storage server,

wherein the at least a second local mirror storage request corresponds to the received

at least a second local storage request.

29.   (Currently amended) The method of claim 24, further ~~comprising the~~

~~steps of:~~ comprising:

~~detecting an interruption in the first heartbeat signal at the remote storage~~

~~server;~~

~~closing the established second connection;~~

receiving at least a second remote storage request at the remote storage server; and

queuing the at least a second remote mirror storage request at the remote

storage server, wherein the at least a second remote mirror storage request

corresponds to the received at least a second remote storage request.

32.   (Currently amended) A system for mirroring data in a computer network,

comprising:

_____   a local storage server; and

_____   a mirror storage server;

~~a~~ wherein the local storage server ~~that~~ receives a storage request, ~~request and~~

outputs a mirror storage request, ~~wherein said local storage server~~ and outputs a first

heartbeat signal at regular first intervals to the mirror storage server; and

a wherein the mirror storage server that receives said mirror storage request, wherein said mirror storage server and processes said mirror storage request, wherein said mirror storage server outputs a response corresponding to said mirror storage request to said local storage server, wherein said mirror storage server outputs a second heartbeat signal at regular second intervals to said local storage server, and monitors reception of said first heartbeat signal for interruption in the regular receipt thereof;

wherein at least one of said local storage server and said mirror storage server establishes at least one connection therebetween;

wherein said local storage server monitors reception of said second heartbeat signal for and detects an interruption in the regular receipt thereof thereof; and

wherein at least one of said local storage server and said mirror storage server closes the established at least one connection.

39.   (Currently amended) A computer program product comprising a computer useable medium having storing a computer program logic recorded thereon for enabling at least one processor to mirror data in a computer network, said computer program logic product comprising:

means for enabling the processor to establish at least one connection between a local storage server and a mirror storage server;

means for enabling the processor to receive a primary storage request from a network host at the local storage server;

means for enabling the processor to send a mirror storage request across the established at least one connection from the local storage server to the mirror storage server, wherein the mirror storage request corresponds to the received primary storage request;

means for enabling the processor to send a first heartbeat signal at regular first intervals from the local storage server to the mirror storage server;~~and~~

means for enabling the processor to send a second heartbeat signal at regular second intervals from the mirror storage server to the local storage server;

means for monitoring reception of the first heartbeat signal and the second heartbeat signal for interruption in the regular receipt thereof, ~~respectively.~~ respectively;

means for enabling the processor to detect an interruption in the second heartbeat signal at the local storage server; and

means for enabling the processor to close the established at least one connection.

40.   **(Currently amended)**   The computer program product of claim 39, further comprising:

~~means for enabling the processor to detect an interruption in the second heartbeat signal at the local storage server; and~~

means for enabling the processor to queue mirror storage requests that result from primary storage requests that are received during the detected interruption.

43.   **(Currently amended)** The method of claim 39, further ~~comprising the step of:~~ comprising:

means for enabling the processor to receive a response across the established at least one connection from the mirror storage server, wherein the response indicates whether data in said sent mirror storage request was successfully stored in a mirror storage device.

48.   **(Currently amended)**   A method of mirroring data in a computer network, comprising the steps of:

establishing at least one connection between a local storage server and a mirror storage server;

receiving a primary storage request from a network host at the local storage server;

sending a mirror storage request across the established at least one connection from the local storage server to the mirror storage server, wherein the mirror storage request corresponds to the received primary storage request;

processing the mirror storage request at the mirror storage server;

sending a first heartbeat signal at regular first intervals from the local storage server to the mirror storage server;

sending a second heartbeat signal, independent of the first heartbeat signal, at regular second intervals from the mirror storage server to the local storage server; and

monitoring reception of at least one the first heartbeat signal and the second heartbeat signal for interruption in the regular receipt thereof respectively~~respectively~~ respectively;

detecting an interruption in the second heartbeat signal at the local storage server; and

closing the established at least one connection.

49.   **(Currently amended)**   A method of mirroring data in a computer network,

comprising the steps of:

establishing at least one connection between a local storage server and a mirror

storage server;

receiving a primary storage request from a network host at the local storage

server;

sending a mirror storage request across the established at least one connection

from the local storage server to the mirror storage server, wherein the mirror storage

request corresponds to the received primary storage request;

processing the mirror storage request at the mirror storage server;

sending a first heartbeat signal using a connectionless protocol at regular first

intervals from the local storage server to the mirror storage server;

sending a second heartbeat signal using a connectionless protocol at regular

second intervals from the mirror storage server to the local storage server; and

monitoring reception of at least one the first heartbeat signal and the second heartbeat

signal for interruption in the regular receipt thereof, ~~respectively.~~ respectively;

detecting an interruption in the second heartbeat signal at the local storage

server; and

closing the established at least one connection.

5.   Claims 1-24 and 26-49 are allowed.

6.   The following is an examiner's statement of reasons for allowance:

The prior art of record does not teach neither singly or in combination the limitation "sending a first heartbeat signal at regular first intervals from the local storage server to the mirror storage server; sending a second heartbeat signal at regular second intervals from the mirror storage server to the local storage server; and monitoring reception of at least one the first heartbeat signal and the second heartbeat signal for interruption in the regular receipt respectively; detecting an interruption in the second heartbeat signal at the local storage server; and closing the established at least one connection" as in claims 1-24 and 26-49.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

7.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hussein A. El-chanti whose telephone number is (571)272-3999. The examiner can normally be reached on Mon-Fri 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ario Etienne can be reached on (571)272-4001. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

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you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Hussein El-chanti

March 28, 2007

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